

Geospatial Learning Pathways Presentation

ArcPad Tools for Field Mapping

by

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This is a Bureau of Land Management Geo-Spatial Learning Pathways presentation. Arc Pad Tools for field mapping is presented by the Montana State Office. This presentation discusses functionality found in the three toolbars within the ArcPad map window: the main toolbar, the browse toolbar, and the edit toolbar. Your presenter is Randy Schardt of the Montana State Office.

The talk today is going to be about Arc Pad 7.1. What is ArcPad? ArcPad is a Mobile GIS software for field mapping and it provides database access, mapping, GIS and GPS integration to users out in the field through the use of mobile devices. The mobile devices that we use here, at the BLM Montana are the Trimble Recon, the Trimble Nomad, the Juno, and the Trimble Geo-Explorer. You are able to customize ArcPad through ArcPad Application Builder. And, ArcPad supports the following Windows operating system: Windows XP, Windows CE, and Windows Mobile. We use Microsoft Active-Sync as the primary software to transfer data between the mobile device and the desktop PC.

Garmin units do not support ArcPad. The question was, "What about Garmins?" I just responded that Garmins do not support ArcPad.

You could also run ArcPad on your desktop, and to do that, ArcPad is located on the Citrix, so you would log into the Citrix. You would navigate down to the ArcPad folder and you would select ArcPad 7.1. And you notice that the application, ArcPad Application Builder, is in the same area. So if you want to do some customization of ArcPad, you would activate the Application Builder right here.

So let's look at the ArcPad map window and talk a little bit about it. The top is your Main Toolbar. The next is your Browse Toolbar. Then you have your Edit Toolbar - your North Arrow. You have your Panning Frame. And your Scale Bar. You have the Command Bar and at the very bottom, you have your Status Bar. That's going to give you your scale and your latitude/longitude.

ArcPad provides a comprehensive set of tools that allow for data capture, navigation within the ArcPad map, data query, GPS navigation, and data editing. So what I'm going to talk about today is we're going to go ahead and look at these tools that allow you to do these things.

First of all, let's talk about the main toolbar. Main toolbar, you have a set of tools there. The first one I'm going to talk about is the Open Map. Click on this, it will open up an existing ArcPad map or a .ap with a .apm extension on it. The next is the Save Map. This will save the current ArcPad map that you're in. This Add Layer allows you to add one or more layers to your current map. You have your Table of Contents; this will open up the Table of Contents dialog box. This will open up your GPS position window. This opens up the ArcPad options dialog box and this will allow you to do a quick reference help.

So let's talk about the drop-down menu for the open map. The first option there is New and you have several options under New. You can pick a quick project. What this does, is this closes the current map and creates a new data capture project with ready-to-use point, poly-line, and polygon shape files. Layers in the current map can optionally be added to the new quick project map. So, in other words, it takes and opens up a new project for you and adds a line feature, a layer feature, and a polygon feature and then it allows you to add other layers to this. The map option will close the current map and will create a new one for you.

Shapefile, this creates a new shapefile and will load it into the current map. You're able to make a quick form which is a custom form for an existing shapefile. You're able to create new graphics and load it into your ArcPad project. And you can create a new photo layer and add it into your current map project.

The next is the Open Map. This will open up an ArcPad. Save Map will save the current ArcPad map. Save As will save the ArcPad map with a new name or you can save it to a different folder. Map Properties will open up the map properties dialog box. And here are the screen shots for the map properties dialog box. Your first tab will be your snapping. This is what the default ArcPad snapping is set to. You have your scale, the default scale, and you can also set a reference scale at window. Information, just gives you the title of your ArcPad project. You can do different extents; you can center to an extent or you can use the extent of your entire ArcPad project. If you have bookmarks set up, you would be able to see your bookmarks here and you will be able to edit or delete them.

Question: "If you have it on the center extent, will it draw faster?"

Randy: And no, it does not draw faster.

And then, the projection tab will give you the projection of your ArcPad project.

The Recent Maps - there is a drop down menu there and will just give you all your recent maps that have been activated and the Recent Layers will give you all your recent layers that you've activated. So, if there are layers that you've used before, you want to use them again, they will be listed here. And then you have your Exit or your Close ArcPad. On your mobile device, you need to use this option to completely close ArcPad. If you just close, use the "X" at the top, upper right, all it does is minimize ArcPad. It will not close it. So if you want to close ArcPad and get completely out, you have to use this exit right here.

Okay, we have the Save Map. This will save the current ArcPad map. This adds one or more layers to the current map. And then we have your Table of Contents box. Table of Contents has three tabs. You have your layers tab, and you can do several different things in this layers tab. You can turn your layers on and off by checking and unchecking them here. You can make your errors editable, right here by checking and unchecking them. You can select a projection for your ArcPad project. You click on this, it will bring up a navigation window and let you navigate to a folder that has your projections in it. You can select a projection. This will display your map properties. You can add layers into your table of contents right here. This will show the properties for the selected layers, so you would select a layer, and click on this, and it would show those properties. You can change the order in which your layers are drawn by highlighting them and click the up or down arrow, and it would change that drawing order. And if you want to remove a layer from the project, you can select it and click the "x" and it will remove a layer.

So, these are some screen shots of your layer properties. I have a layer called Sign, and in the first one it gives the name of the layer and if there were any comments. The next tab are your labels and if you want to label your layer in your ArcPad session, you can by clicking labels, using the field, and it will label those. Or you can do labels using an expression. It will give you the symbology for your layer and it will give reference scale. You can have the layer drawn at all scales, or if you want to set a reference scale, you can set that here.

You have a hyper-link field that you can set if you have pictures associated with your layer, then you want to use the hyperlink. You have to set the field where those pictures are, so you can

see them. And you do that here. And you have your attributes layer, or tab, to click on attribute that you want to see. Lastly, you have your transparency. You can set a transparency to your layer.

Next on the Table of Contents is your legend tab and this just will give you the legend of all your layers. You can go ahead and you can change your symbology here if you wish. You just click on the symbol and you can change that symbol. Snapping - this sets the snapping for your editing purposes. And you can check the boxes of what you want to snap to and what layers you want to snap to.

Okay, the next is the GPS window drop-down. And the first option will open or close your GPS window. The next is (GPS Position Window), allows you to activate or deactivate the GPS. The GPS track log starts and stops the storing of the GPS points and the track log, shape file. You have the GPS preferences, this will open the GPS preferences dialog box. And this is the GPS dialog box; you have your GPS tab. You're able to set your port and baud rate. If you have an internal GPS on your unit, chances are you will have to set that to whatever the setting on your GPS is set to. If you're using a Bluetooth, you would have to set this to COM 8; you need the port to be Com 8 and that would read your Bluetooth GPS. Capture, if you want to enable averaging of your capture, gives you a more accurate data. You're able to do it here by checking enable averaging and you can tell it how many points you want to average. Quality, this is where you can set your warnings for your PDOP, your maximum EPE, 3-d mode, GPS height, the datum and the alerts. If when you're in GPS and there are certain alerts that will pop up, it will either give you a window or a sound. You can turn these on or off if you wish by this window right here. And give you the last known GPS location.

The Tools drop-down list, the Options, will open up the ArcPad options dialog box. And these are your ArcPad options dialog box, the first is the Display tab, and you can tell it, the display unit, that you want ArcPad to read in if you do US units, it will put it in feet or miles. The status bar coordinate format is, well, this is set to degrees, minutes, seconds right here. You can have UTM, you can have decimal degrees. The background is the color of background in your ArcPad session and the default is white. The highlight is what is selected and the default will be that magenta color. So you can change that if you wish. And then you can change the pixels for the pen tolerance and the highlight.

The next option is for the Camera. If you have an integrated camera that you're using to collect photos, or take photos, you can change the path where these photos are and the picture quality.

The Paths, this allows you to set the default maps in data path. And also will allow you to, if you have any applets that you've created, you will allow you to tell where these applets are located.

The next is the Fonts. You can change your label fonts here. The general, shows the start up dialog, so every time you start up ArcMap, if you don't want to see that start up dialog box, you would uncheck it here and you would not see any of the previous ArcPad sessions that you've opened recently. The check SQL engine on start up, always leave this box unchecked. If you check it, there will be an error message pop up every time you open up ArcPad. It will allow you to go past it, but you will get this error message. So, if you don't want to see that error message, just uncheck it.

The next is the Tools drop-down list. And we have the scale bar and this displays, or hides, the scale bar. Panning frame will display or hide the map panning frame and in ArcPad if you have it turned on, the panning frame gives you an arrow on each side. And that will allow you pan around that way. Status bar will display or hide the status bar. And, you'll notice in the lower right-hand, there is your status bar. It gives you the coordinates and the scale that you're at.

The North Arrow will display or hide the north arrow in your map view. The Camera option there, I didn't do the camera option because it was the same as I discussed previously. It just allows you to set your camera settings. The Toolbars will display a sub-menu containing all the toolbars in ArcPad. So if you click on that, it will show a drop down of all the toolbars that are present for ArcPad. And you're able to choose the toolbars that you want shown. So if you choose browse and edit, browse toolbar will show up and your edit toolbar will show up.

The next is your utilities and this will display a sub-menu containing your utility tools. And, these are utility tools that will show up on the drop down. Pack shapefile will pack a shapefile by removing the records flagged for deletion. So, basically what pack does is it just saves your shapefile. You're able to reproject the shapefile to another projection and/or datum. And you can export the ArcPad's projection information.

So, we've completed the browse toolbar, or the main toolbar. Let's talk about the Browse Toolbar. You have your zoom in. And when you click your zoom in, you'll have your zoom in drop-down list and you're able to zoom in using the pen. You can zoom out. You're able to pan and you're able to rotate the map angle, rotation angle. Zoom to full extent tool, drop-down and you'll get a fixed zoom extent and every time you click, it will zoom in by 25%. Zoom out works the same way, except every time you click, it will zoom out by 25%. If you have any items or

features selected, it's going to zoom to the extent of the selected features by choosing this. If your GPS is activated, this will center the map on the current GPS position. This zooms to the full extent of the ArcPad session. And this will zoom to the layer, to the extent of a particular layer, so there's a drop down that lists all your layers. You are able to go in and zoom to any particular layer that you want.

Go to previous extent button, you're able to go back to your previous extent and you can zoom forward to the next extent in the extent history. So if you go back, you can also go forward. Create a bookmark, you can create a spatial bookmark here and that bookmark will show up in your table of contents under your bookmarks. Your identify tool, brings a drop down and you're able to click on this to activate the identify tool. You can activate this one and select on the feature and it'll bring up a window and give you information about that feature that you've just tapped on. You're able to measure the distance in a map view in point mode. That means you can select an end point, a beginning point and an end point and it will do a straight-line measure between those two points. There's a radial measure, it measures radial distances in the map view. A free-hand measure, which is basically just what it says. It's free-hand, you can click and draw a free-hand line and it will measure that distance. A hyper-link tool, you can click on this and click on a feature and it will show the photo to that feature. Go To, if you select this and activate to Go To, you can navigate to that feature. And advance select, this allows you to activate the advance select tool and enables you to select features.

Next on the browse tool is the Find, of the Find drop-down list, you'll see this. You're able to find a feature and this will open the Find Tool. This is the Find Tool right here. You're able to do a query and you're able to do it on a field containing a certain value or equal to a certain value and it will give you the results for that find. Once these results are found, there are several different things you can do. There's an identify, so everything that's selected in this results table, if you do an identify on, it will identify those things. It will give you the feature properties for the selected features. You can set a "Go To" destination for the selected features. You can zoom to the selected features. You can do your center tool and it will center to the selected features. If you want to select different features here, you can use your select tool and select different, other features there in that list. And you can use your hyper-link tool and it would show you the picture for the selected features.

Next is the Clear Selected feature and what this does, if you have some features selected, if you would hit Clear Selected feature, it would clear all your selected features out.

Next you have the Start/Stop editing and this will display a sub-menu containing all your editable layers in ArcPad map and you do this by tapping a layer, toggle this editing state. So if you would choose the editing toolbar there, it would drop-down the list of all the features or all the layers that are in your ArcPad session. You are able to select the ones that you want to make editable. And you can have more than one selected.

Lastly, is your Refresh or redraw your map. So if you want to, if it gets - sometimes when you're, if you click too fast, it will, kind of, freeze up on you or stop drawing. If you want to refresh your map, just hit Redraw here and it would refresh it for you.

Next let's talk about the Edit Toolbar. And in the edit toolbar, we have the select tool. And for the drop down for the select tool, we have several different options. We have select, and this activates the tool. This will activate the select and vertex editing tool. So if you're editing something and you want to move vertexes around, this is the tool you would use. You're able to select using the GPS position. So, if you have an active, if you're GPS is active, and you want to select according to that position, you would use this tool right here. You're able to center on a selected point. You're able to zoom to a selected feature. If your feature is selected, you're able to go to that feature, so you can select and set that as your current destination. Or you can totally clear your selected features out.

Next we have the Point. So you're going to activate the Point feature if you're going to want to data capture. So, if there are points you want to capture, you're going to hit the point. If you want to capture straight line using the pen, you would use line. A poly-line will activate the poly-line feature for data capture. You have your free-hand line, captures a free-hand line using the pen. You're able to capture a rectangle polygon and a regular polygon feature. You can do an ellipse. You can capture a circle polygon or you can do a free-hand polygon using the pen. These options down here are for text. You can do a text point, a text line, text polygon, text rectangle, or a text ellipse.

The next is your capture point using GPS. If GPS was active right now and we were able to use it, these would not be grayed out, they would be in color. But since this is, I took this from the desktop ArcPad; GPS is not active. But, this option here allows you to capture point feature in the editable point layer using the current GPS position. So, if you wanted to capture just a point, and you would make that layer editable, and you would click on the capture point using GPS, and it would capture that point and then you would be able to enter your attribute information.

Next is Add GPS vertex. This is going to allow you to capture single vertex in the current poly-line or polygon feature using the current GPS position. This next option allows you to add GPS vertices continuously. So if you're collecting a polygon or a line and you're walking a fence line or walking or making a polygon, you would click this, and it would add vertices. And then it would create your line or polygon.

The next is your feature properties and this will open the feature properties dialog box or your custom edit form for the selected feature. And this is your offset point. It would activate your offsets for point data capture.

Let's talk a little bit about the feature. The feature properties' drop-down list has several different options. Or the, feature properties, this opens up the features properties' dialogs box for the selected feature. Insert vertices will allow you to insert vertices to a selected poly-line or polygon. A pen vertices allows you to add new vertices to the end or tail of your selected poly-line. Move feature, you're able to move the selected feature. Rotate allows you to rotate the selected poly-line or polygon feature. You can change the size of the selected poly-line or polygon feature relative to the original size. Or you can change the size of poly, the selected poly-line or polygon feature by using the re-size feature. Or you can totally delete the feature, the selected feature, by choosing this option right here.

The offset point, you're able to activate your offset point for point data capture. This will offset the poly-line or polygon to the left or right of the poly-line of polygon feature that's selected. You're able to do a linear traverse. You're able to do a radial traverse. You can set your preference point A, set your reference point B for capturing the two point offset. You can create a segment poly-line or you can repeat your attributes if you've collected data and you want those same attributes on the next feature that you're going to collect, you would hit this and it would repeat all your attributes from the previous feature.

Talk about the command toolbar, it's down in the lower left-hand corner. The command toolbar, there's several different tools you have. You have your lock and what this does is it disables the ArcPad application from pen or mouse input. So if you lock the screen, you're going to have to tap to unlock again and then you're able to use ArcPad again. This option allows you to save your geometry changes. So if you collect geometry, new geometry, and you want to save those changes, if this was active it would be green. You'd be able to just hit the check and it would save your geometry.

Proceed to attribute capture, if you're collecting geometry changes and you want to add attributes, attribute data to your geometry, you would click the arrow, and it would bring up your attribute table and you would be able to enter your attribute information.

Undo, this will undo just the last edit made to the feature. This pen toggle enables or disables the pen for capturing new features. And cancel, this will cancel the editing of the feature and not save it.

Basically, that is the toolbars that are available in ArcPad. Are there any questions?

Question: "Before you start selecting polygons or lines or points, do you have to have shapefile created before you start?"

Randy: Yes, you do. And you can either do that, you can do it, in ArcMap before you go out and transfer the data over to your ArcPad or your mobile device. Or you can create a new shape file in ArcPad. Set the projection and then you're able to collect data for that. And the shapefile, or the feature, have to be editable before we'll collect it. So, you have to make it editable, and then you're able to collect data for those.

What I did is, you can go in and if we go to Table of Contents right here, you click on it. You see that there is a feature in there, or a shapefile, called Sign. With the information checked and the pen checked and the eye is checked, that means we can see it. We can do an Identify on it and we can edit it. So let's go ahead and let's click ok to that and let's go ahead and let's enter some new information. So we're going to want to do is we're going to want to click on the point and we're going to edit and we're going to enter some new information. What this is, this is a custom form. You can either make a quick custom form in ArcPad when you create a shapefile or you can create a form in ArcPad Application Builder. So this form was created in ArcPad Application Builder and what it is it's for to collect sign data.

So let's just go ahead and let's just collect some information here. Equipment number, I really don't go out and collect signs so a lot of this stuff is just going to be some bogus information. So for equipment number, I'll just enter just something. Find text, let's just say it's a stop sign we're collecting, so I'll just put stop. For the category we're able to have a drop-down for the category and a list of items that we can put in there, so we're going to select a regulatory. And for sub-category, another drop-down, we'll just put it's a traffic control sign. Location text, we'll

just type in corner. Now you notice up here, we're able select from the drop down. The next screen is going to allow us to enter some more information about the sign. So, there's a, for the sign's shape, we have a drop-down menu and we'll just pick octagon. Assign sub straight, we'll say it's an aluminum sign. Sign face, we'll say it's a decal. We have this set as a "no" for the default, but if it is reflective, we can pick the drop down and pick yes. Sign color, we'll just pick red. The sign height in inches, we'll have to type in inches there. And width, we can type in width. We can click on the next tab. Post type, we will say it's a metal post. Post shape is square. Post size, we'll say it's two inches. Post length in inches, we'll say it's 96 inches. Post number is one and we don't need a comment. Inspector, just put my last name. Install date, it'll default to today's date. If it was installed at an earlier date, we click on the arrow. It will give us a calendar, where you're able to go and pick any date that we want. If it's a different year, we're able to pick a different year. So, we'll just pick April 10th of 2006. The action date will be today's date. Line action, we'll just say we're inspecting it today. And it's good, post action is inspected. We will click on the next tab, the post condition is good. Now if we want to see all the information that we've put in, we would click on the attributes tab. It lists our information now for the data that we just collected. Go back to our forms again and if the data is collected and it's right, we would click ok and now it makes a feature for our sign shapefile.

So if we would go in and we would hit hyperlink, what we need to do is we need to set. So, if we go in and we go to here, we would go to hyperlink. It tells us that the photo field is what the hyperlink is going to use. So if we would have a picture with this sign, we would take a picture with it. We would set that hyperlink field to photo and make sure that the name of that picture or photo was in that photo field and then we would be able to use the hyperlink.

So that's just kind of a quick demo on ArcPad and using forms in ArcPad.

Thad: Randy, this is Thad in South Dakota.

Randy: Yeah, go ahead.

Thad: I was wondering, is it pretty easy to create those forms in the ArcPad Application Builder?

Randy: Yeah, it's really not difficult. You can do a little bit of programming and put some code in there. That gets a little bit more complicated. But, just creating the form is

not difficult. Takes a little - once you get around in ArcPad Application Builder, once you make one, it's not difficult to do others.

Question: "How difficult is it to bring in your data dictionaries into this forms format?"

Randy: There was a program at one time that automatically imported your data dictionaries into the ArcPad forms format. But, it is no longer being used. It was created by EDS or Electronic Data Solutions. They're no longer selling that, or distributing that. So, at this point, I don't know of an easy way to do that other than just doing it manually in ArcPad Application Builder. You know, and it really doesn't take that long to do. I mean, I did the signs one from the data dictionary and it just took me a couple of hours to do. It really wasn't that difficult to do. And there was quite a bit of data dictionary information that needed to be entered.

Question: "When you enter numbers into ArcPad, is there a way to get those numbers out into a spreadsheet?"

Randy: Yeah, there is. What ArcPad -- is just using a shapefile. And what you could do is you could bring that shapefile back into ArcMap and export that table out into an Excel spreadsheet or whatever you want it to do. It's basically, it's just a DBF what ArcPad uses. And you can bring that DBF into an Excel spreadsheet. Did I answer your question?

Voice: Well, yeah.

Yeah, right, yeah. You can --- it's just a DBF. Actually, what we have now is, we use GPS Analyst and that will do your correction for you for ArcPad.

Randy: If you are using TerraSync, you still need to differentially correct your data. But, ArcPad you do not have to do that.

Any other questions? Have a good day everybody.

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00:39:10